observed. With a great many observations the anticyclonic inflow can be brought out by a system of averaging, as shown in the *American Meteorological Journal* for August 1893.

H. Helm Clayton.

Blue Hill Meteorological Observatory, June 17.

Effects of a Lightning Flash in Ben Nevis Observatory.

Whenever a thunder-storm passes the summit of the Ben, there occurs almost invariably a discharge from metallic bodies in the Observatory, as the cloud is passing away. A flash of greater or less extent is given off the stoves, accompanied by a sharp crack. In January 1890 there was an exceptionally severe flash; "one of the observers was almost knocked down when sitting writing, and the telegraph wire was fused, and all communication stopped for five days." But more destructive than any previous flash was that which occurred this year on June 19, when the Observatory narrowly escaped being destroyed by fire. Between two and three o'clock on that afternoon, repeated clicks on the telegraph instrument were heard by one of the assistants who was sitting in the office; he had been carefully noting the times at which the clicks occurred, when suddenly the whole office was filled with a brilliant flash and deafening roar. A pillar of smoke was discharged from the telegraph instrument and from the stove-pipe, filling the room. So severe was the flash that the assistant, who was quite deafened by the report, thought that his hair had been singed. A second slighter discharge took place immediately after, when the writer had entered the office to commence the fifteen hours observations. The discharge hurled two boxes and a small picture, that were in the vicinity of the lightning protector, across the kitchen, and blew off the button and outer casement of the electric bell in the visitors' room. The solder on the kitchen chimney outside, a copper fastening of the lightning conductor, and many portions of the telegraphic wire and apparatus were fused, and the woodwork of the Observatory was scorched in several places. The great flash occurred at 14 hours 57½ minutes, and the hourly barometric reading was taken at 15 hours, as usual. There was a very heavy fall of snow at the time, equivalent to 0·470 inches of rainfall for the hour, but in the confusion the writer omitted to take the rain-gauge with him, and had to return for it. This was a fortunate incident; for it was only on leaving the office for a second time, that he observed smoke and flame issuing from behind the panelling between the kitchen and the office. Assistance was secured, and the fire—which was in a very awkward and dangerous place—was overcome in good time, and the damage done was very slight.

The damage done to the telegraphic apparatus, however, was serious, and Mr. Crompton, engineer of the Post Office telegraphs, has supplied me with the following information.

The lightning protector was badly fused, the plates showing a patch of fusion as large as a sixpence. This saved the cable from serious damage. All connecting wires within the building were rendered useless. The majority were so heated as to melt the insulation off, and, in one or two cases, the copper conductors were melted by the discharge. In one case, the fusion set fire to the woodwork.

The coils of Neale's sounder were fused and rendered useless. The keys suffered worst of all, the left pedal or "tapper" bearing the strongest evidence of the severity of the discharge. The back contact (platinum), the brass extension holding the same, and the steel spring (platinum-tipped) above, all being fused into one solid amalgam. The pillar, to which the zinc leading wire from the battery was connected, had a large patch of fusion near its base, and the front platinum contacts of the same (left-hand) pedal were consumed entirely. There were small traces of fusion on the right pedal, but of a trifling character. The line wire connected to the left-hand terminal of the coil had been fused close to the terminal. The interior of the instrument case was considerably blackened, as also the greater portion of the keys, as a result of the "arc" caused by the discharge at the moment of fusion.

The vacuum protector at Aslimtee, the base of the cable, also the plate protector in Fort William Post Office, were fused, but only slightly, the main discharge having expended itself on the summit. The Low Level Observatory instrument and protector were unimpaired, and communication between there and Fort William Post Office was carried on as usual after the removal of the fault in the Post Office protector.

The registering aneroid shows a slight upward kick at the time, but the curve is otherwise fairly steady; the temperature was 31·7° F., the wind south-south-east and light. Heavy snow was falling at the time, which, with a fall on the 17th, made a total depth of nine inches on the summit. St. Elmo's Fire was very strongly felt and heard until after seventeen hours.

William S. Bruce.

The Kinetic Theory of Gases.

It seems to me that Mr. Burbury's and Prof. Boltzmann's last letters will enable us to reconcile all the *main* differences of opinion which were brought to light in our recent correspondence in the columns of Nature. From Prof. Boltzmann's letter it appears that the Minimum Theorem can only be applied with absolute certainty to gases whose molecules are not too closely crowded together. Thus the proof that an aggregation of molecules tends *continuously* towards the Boltzmann-Maxwell distribution depends quite as much on assumptions as to the mixing of the molecules *between* collisions as on consideration of what happens *at* collisions. We cannot prove for certain that densely crowded assemblages of molecules such as solids and liquids tend to assume this distribution, and this is just as it should be, for when a substance is capable of existing simultaneously in two states, the distribution cannot be unique. For the same reason the proof does not apply to molecules moving about in a *continuous* medium such as the ether. So far from this limitation being a weak point in the proof, it precludes the theorem from proving too much, or from leading to results which may not accord with experience.

If we do not know that solids and liquids satisfy the Boltzmann-Maxwell distribution, we, nevertheless, know that they are subject to the Second Law of Thermodynamics. It cannot be said that any dynamical "proof of the Second Law" that has yet been given, is so conclusive as the mere statement of the Law itself, but the proof of the Minimum Theorem subject to "Condition (A)" leads to a result somewhat analogous to the statement that when two or more bodies at unequal temperature are brought into thermal contact, their entropy tends to increase. For let the probability of the coordinates on momenta of the molecules of one body lying between certain limits be proportional to F (*all* the coordinates and momenta being included in the multiple differential by which F is multiplied). Let the corresponding probability for a second body be proportional to *f*. Then when the two bodies are placed in thermal contact, we know of no relation connecting the two simultaneous probabilities, and we may therefore assume them to be independent, so that condition (A) is satisfied, at any rate initially. The theorem then asserts that at all subsequent instants of time, the value of the Minimum Function will be not greater than its initial value, and therefore it either remains stationary or decreases every time the process is repeated. Thus far we can get if no further.

The application of the Second Law depends largely on the distinction between *available* and *unavailable* energy. When we construct a thermodynamic engine for converting heat into work, we introduce just the kind of external disturbances that Mr. Burbury requires every time that the "working substance" is placed in contact with either the "source" or the refrigerator." G. H. Bryan.

An Abnormal Rose.

I have in my garden at Reigate a *white* Moss rose-tree, every blossom on which is white except one which is half white and half red, divided diametrically in nearly equal portions.

The colours are not shaded one into the other, but are perfectly distinct, and one petal is half red and half white, the edge of the colouration being quite sharp.

I am told that one similar blossom was produced earlier in the season.

I imagine this is an attempt to revert to its ancestral colour, but by what mechanism such a partial result has been accomplished seems difficult to understand.

Newnham Browne.

There are several varieties of rose that sport or revert in the manner described by Mr. Newnham Browne. The "York and Lancaster" rose is a familiar example. In this, the recognised or genuine condition is red and white striped; but the proportions of white and red are rarely exactly the same in any two flowers

© 1895 Nature Publishing Group

on a bush, and very frequently some are wholly red and some, perhaps, wholly white, though I am not sure on this point. Many other cross-bred plants exhibit this inconstancy, which is supposed to be due to an imperfect blending of the elements of parentage. That the sporting is irregular and inconstant is not to be wondered at, when we consider that a plant is not an individual in the sense of possessing only one set of organs. Any vegetative bud of a plant is capable of producing any and all of the organs of the whole plant, or, if detached from the parent plant, to develop into a similar organism, with all its attributes. Given, then, a cross-bred variety, which is not constant, or "fixed," as florists term it, any vegetative bud may give rise to the cross or to one or the other of the parents.

W. BOTTING HEMSLEY.

Mineralised Diatoms.

NEARLY twenty years have elapsed since you allowed me to announce in NATURE the unexpected discovery of mineralised diatoms in the London clay of Sheppey.

Subsequent investigations demonstrated the existence of these unique microscopic fossils on the same geological horizon at several widely separated localities in the south-east of England; leading to the assumption that the band of diatomiferous earth was continuous throughout the formation.

Herne Bay was one of the places at which, in accordance with expectation, search was followed by success. Revisiting this place, a few days ago, for the first time since the discovery, I readily found the fossil diatoms as abundant as before in some recently fallen blocks of clay about half-way between Herne Bay and Oldhaven Gap. As there has been much waste of land at this spot during the interval, it is interesting to observe the presence of these diatoms in the newly exposed clay, giving support, as it does, to the hypothesis of their general distribution at a definite level throughout the London clay.

Perhaps some readers of NATURE may be going to that part of the coast before long, and will then take the opportunity of verifying my observations.

W. H. SHRUBSOLE.

SIR JOHN LUBBOCK AND THE TEACHING UNIVERSITY FOR LONDON.

THE address in which Sir John Lubbock solicits the suffrages of the Electors of the University of London has aroused feelings of surprise and regret among the friends of higher education in London, owing to the unfortunate nature of the references made to the Teaching University question. Six paragraphs out of ten are devoted to this important subject, and it seems almost incredible that so far from recognising that the Gresham Commissioners' scheme has enlisted a considerable measure of support in the University (*cf.* vol. l. 269; li. 298), Sir John Lubbock refers only to the views of its opponents, and, in accepting them, makes the remarkable statement:

"Feeling that Convocation ought to be consulted on a matter so vitally affecting the University, I would strongly urge, and do my best to secure, that the scheme when arranged should be submitted to Convocation for their approval, to be signified as at a Senatorial Election, and would oppose the Bill unless this were conceded."

Now it must be borne in mind that the Report of the Gresham Commissioners has met with a degree of approval from educational authorities and institutions, which not only far exceeds that extended to any previous attempt to solve the vexed question of University reform in London, but has been sufficiently unanimous to lead to the introduction of the "University of London Act, 1895," in the House of Lords by the late Government. This Bill, in accordance with the general tenour of the resolutions passed by the various institutions named in the Report as constituent colleges of the teaching University, enacted (clause iii. para. 1):

"The Commissioners will have power to make statutes and ordinances for the University of London in general accordance with the scheme of the Report hereinbefore referred to, but subject to any modifications which may appear to them expedient after considering any representations made to them by the Senate or Convocation of the University of London, or by any other body or persons affected."

And further (para. 2):

"In framing such statutes and ordinances, the Commissioners shall see that provision is made for securing adequately the interests of non-collegiate students."

Convocation in January last had the opportunity of exercising its veto in meeting assembled as provided by the Charter of the University on the scheme of reconstitution proposed by the Commissioners, which had previously received the general approval of the Senate. Instead of insisting on this right, it preferred to bring itself into line with the other institutions affected by the scheme, by adopting a resolution in terms almost identical with those employed in the Bill. Only so recently as May, it declined to reconsider this attitude by a majority of two to one, yet it is clear that the Bill, if again brought forward, is to meet with opposition from Sir John Lubbock, if reelected, unless an amendment is inserted providing that the completed scheme shall be submitted to Convocation for approval in a manner expressly excluded under the terms of the present Charter, viz. by means of a referendum.

It is difficult to imagine by what process of reasoning this seemingly gratuitous proposal can be reconciled with the functions of a statutory, that is a judicial and executive, Commission. Convocation is but one of the bodies affected by the scheme, and in common with the others, it can, under the terms of the Bill, present its case for modifications in the scheme to the Commissioners before the statutes are framed, and like them can appeal against the statutes during the forty days they must lie on the table in both Houses of Parliament before they become operative. Such an amendment could only have the effect of wrecking the latest and most satisfactory scheme of University reform, since no other institution affected by the scheme could be expected to agree to such an unprecedented proposal. Nor is it likely that any person fitted to occupy the position would consent to serve on the Commission, and devote his time and best energies to the difficult and delicate work of adjusting the relations between these institutions, with the knowledge that the statutes and ordinances eventually framed would be subject to the approval of any irresponsible, non-judicial body, let alone one of the institutions closely affected.

For the most part, Sir John Lubbock has held aloof from the controversy on the Teaching University question. Once only does he seem to have taken sides. It is on record that he voted with the majority when the Senate in June of last year passed a resolution expressing general approval of the proposals of the Gresham University Commission, with which action his present attitude is wholly inconsistent. It would be interesting to know whether his descent on the other side of the fence is in any way connected with the absence of opposition to his candidature on the part of the opponents of the scheme. Be this as it may, this uncalled for proposal to subordinate the interests of higher education in London to the pleasure of Convocation, ascertained not after debate, but by a referendum, is not to pass without protest, and we are glad to note that the following letters have already appeared in the press. The first is from Prof. Michael Foster, Sec.R.S., and President of Sir John Lubbock's Parliamentary Election Committee.

"Shelford, Cambridge, July 4, 1895.

"Dear Sir John,—As you know, I am wholly opposed to your view that the scheme for the University of London to be proposed by the Statutory Commissioners ought to be submitted to Convocation for approval. You also know that this difference of opinion, important as it is, does not prevent my desiring that you should continue to

© 1895 Nature Publishing Group